RARE Project: Migration of PFOA and HFPO-DA from Contaminated Soils to Surface Water and Groundwater near Washington Works facility

• Rare Team Members

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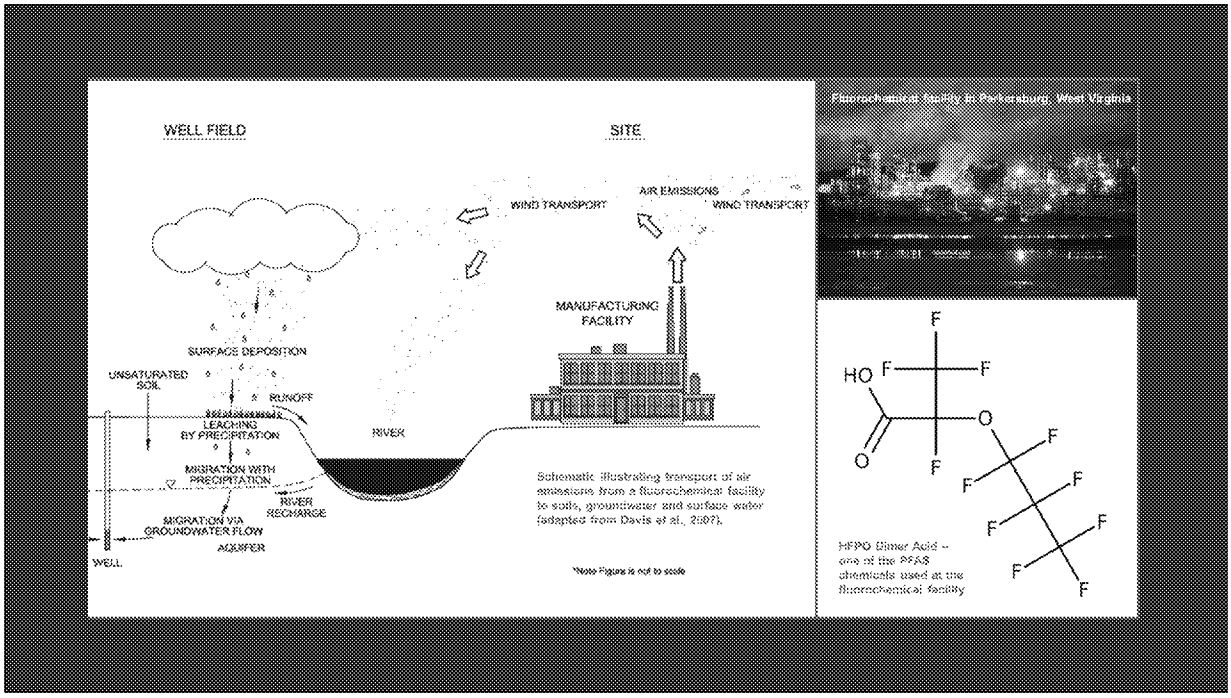
Data will help predict migration pathways of PFAS through soils to gw and sw resources

Presentation Overview

- Background & History of Washington Works
- EPA SDWA Enforcement Program Involvement
- Sampling Conducted, Water Supplies Addressed and other activities required under SDWA Orders
- RARE Project Objectives and Timeframes
- Stakeholders Involved

Washington Works Background & History

- Built around 1949 – 1950 by DuPont, located 5 miles west of Parkersburg, WV on the SE bank of the Ohio River
- Teflon Manufacture began in 1951 and continues to present
- PFOA used in Teflon manufacturing process – used till 2013 when replaced by HFPO-DA (GenX) believed to be less toxic.
- In 2015, DuPont turned operation over to spinoff Chemours
- Chemours continues production of Teflon using GenX


WELL FIELD
SITE
WIND TRANSPORT
AIR EMISSIONS
WIND TRANSPORT
MANUFACTURING FACILITY
SURFACE DEPOSITION
UNSATURATED SOIL
RUNOFF
LEACHING BY PRECIPITATION
MIGRATION WITH PRECIPITATION
RIVER
RIVER RECHARGE
MIGRATION VIA GROUNDWATER FLOW
AQUIFER
WELL
Schematic illustrating transport of air emissions from a fluorochemical facility to soils, groundwater and surface water (adapted from Davis et al., 2007).
*Note: Figure is not to scale
Fluorochemical facility in Parkersburg, West Virginia
HO
O
F
HFPO Dimer Acid – one of the PFAS chemicals used at the fluorochemical facility

EPA's SDWA Enforcement Involvement

- In 2001, EPA and other regulatory agencies received letter from attorney Robert Bilott represented cattle farmer alleged to have lost 200 head to contaminants leaching from DuPont landfill.
- Bilott's comprehensive document search revealed damning information about PFOA toxicity and what DuPont had known.
- Bilott's letter made a strong case that DuPont had violated several environmental statutes, including TSCA, CAA, CWA and SDWA.

EPA SDWA / WVDEP Response

- SDWA Enforcement Branch met with WVDEP
- In 2001, WVDEP issued Order to DuPont requiring extensive DW, GW and SW monitoring. (Monitoring revealed that the predominant mode of contaminant transport was from air dispersion and deposition.) DEP order also required the creation of team to access PFOA toxicity in DW (CATT)
- In 2002, EPA Water Enforcement Branch issues SDWA 1431 Order to DuPont which addresses potential endangerment to DW supplies – contingent on PFOS toxicity determination

DW Screening Levels & SDWA Orders

- CATT determines PFOA DW screening level – 150 ppb
- No action necessary under 2002 SDWA Order
- New PFOA toxicity studies, DW screening level now 500 ppt
- In 2006, EPA issues superseding SDWA Order to DuPont
- In 2009, EPA OW issues PHA for PFOA – 400 ppt, 3rd SDWA Order issued to DuPont
- In 2016, new toxicity studies, EPA OW issues LHA for PFOA + PFOS - 70 ppt. EPA amends SDWA Order to reflect new HA.

Actions to Date by DuPont / Chemours

- Ten PWS in WV and Ohio provided with GAC treatment
- 140 private water supplies in WV and Ohio provided GAC
- 115 private water supplies hooked up to PWS
- Over 500 square miles of area impacted with PFOA > HA
- Continuing to monitor into new focus areas of concern

HFPO-DA (GenX) Monitoring

- In 2018, EPA requested Chemours to voluntarily monitor 28 public and private drinking water wells for GenX
- Six wells closest to Washington Works indicated presence of GenX in the raw untreated ground water.
- GAC treatment was effective at removing GenX in finished water
- Chemours continues to monitor wells quarterly – concentrations appear to be edging upward

Other Activities not Addressed by SDWA Orders

- Civil action settlement required large population toxicity study
- 70,000 population participated
- PFOA exposure related to 6 adverse health conditions
- EPA TSCA program penalized DuPont $16 million for failure to report toxicity findings in timely manner
- DuPont agreed to undertake vast study of local impacts to soil, groundwater, vegetation, and uptake by animals and fish
- Two movies made in recent years about Washington Works facility and PFOA

Regional Applied Research Efforts (RARE) Project

- EPA ORD leading with support from R3 & R5
- EPA will be coordinating overall effort, finalizing sampling plans, and conducting chemical analysis
- Primary objective = evaluate the migration of PFAS from contaminated soils to surface water, ground water, and vegetation in vicinity of Chemours facility

Purpose of the RARE Project

- Better understand the conditions that influence movement of PFAS from soils to surface and ground waters
- More fully characterize the geographic extent of contamination around PFAS manufacturing facilities

It is anticipated that results will be useful in assessing the impacts of PFAS in other contexts and sites

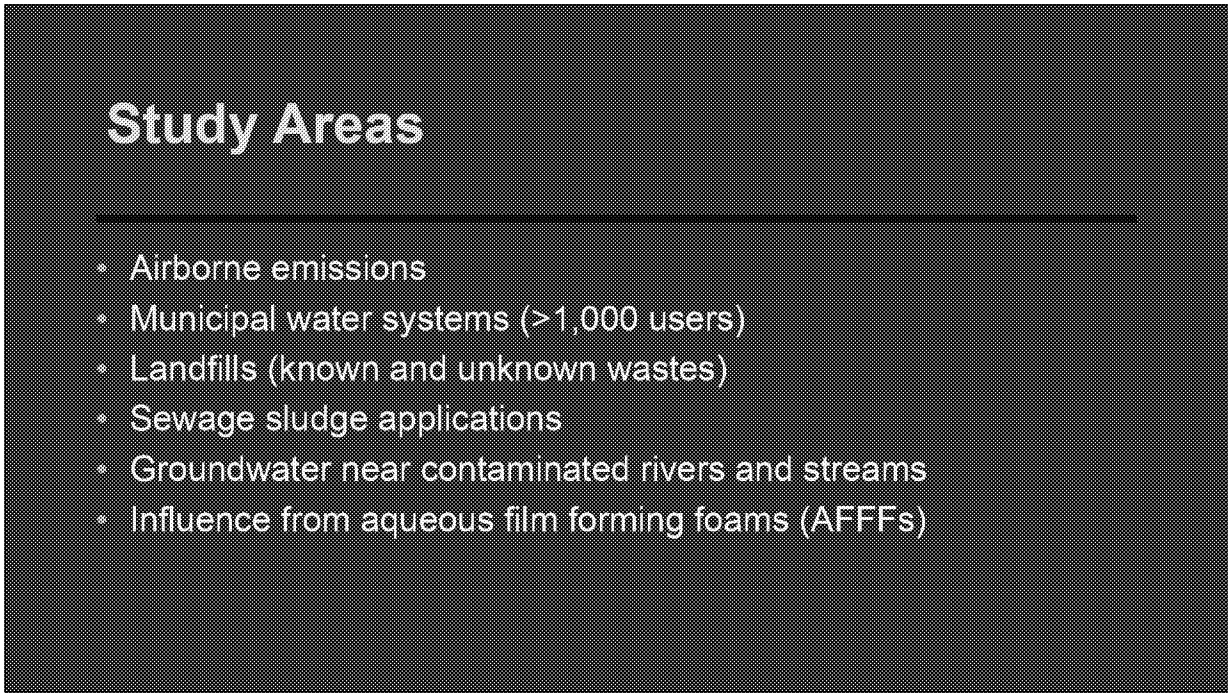
conditions that influence movement of PFAS from soils to surface and ground waters are not well known

Project Framework

- Characterize soil PFAS contamination from air emissions
- Characterize surface and groundwater concentrations and their relationships to areas with documented soil contamination
  - Identify 100 sampling sites for data to be collected
- Develop baseline measurement of other PFAS that may be in waters
  - Two references sites (one OH, one WV) to establish PFAS background
- Evaluate factors and sources that influence PFAS in local environment

Ex.9

Study area = 150 km radius (93.2 mi)
-shaded areas = govt owned lands
-diamonds = different sampling points/types



1. Determine extent of impacts from airborne emissions
Samples to be collected along two predominant wind directions as far as 150 km from the facility

2. Smaller muni water systems not tested in EPA UCMR3 – 9 total
Serving at least 1000 users

3. As PFAS wastes are known to be buried at many area landfills
-examine the impacts at sites known to have received PFAS wastes and other area landfills within 80 km where the history is unknown.
-Samples will include groundwater from landfill monitoring wells and
-surface water from nearby streams that are both up and down gradient of each landfill

4. All municipal sewage sludge (biosolids) contains PFAS due to the frequent use of PFAS in consumer use items and the potential for PFAS-containing industrial emissions to be discharged to local WWTPs.
-samples will be collected in portions of waterways that are both upstream and
downstream of sludge application areas

5. At least two sites within 20 km of the fluorochemical facility have been identified as having PFAS from Chemours (PFOA and HFPO-DA) along with an additional chemical profile that is consistent with AFFF contamination (PFOS and PFHxS).
-A total of 9 sites have been selected to confirm previous indications of AFFF use and to investigate the potential upstream origins of this contamination (Figure 7, Table 1).

6. At least two sites within 20 km of the facility have been identified as having PFAS from Chemours (PFOA and HFPO-DA) along with an additional chemical profile that is consistent with AFFF contamination (PFOS and PFHxS).
-A total of 9 sites have been selected to confirm previous indications of AFFF use and to investigate the potential upstream origins of this contamination

Summary of Project Goals

- Assess the mobility and transfer rates of PFAS in different media
- Establish a geographical range of measurable impacts
- Help OH & WV with ongoing efforts to identify and remediate PFAS contaminated drinking water resources
- Aid in overall understanding of PFAS contamination and development of mitigation strategies to minimize human exposures

assess the mobility of PFAS from contaminated soils to surface and groundwater resources

Establish a geographical range of measurable impacts from historical airborne PFAS emissions from the WV Chemours facility

Help OH & WV with ongoing efforts to ID and remediate PFAS contaminated DW resources
Continue to identify populations that may be exposed to PFAS

Help overall understanding + development of mitigation strategies to minimize human exposures
**It is anticipated that results will be useful in other PFAS contamination contexts, such as industrially impacted sites, communities affected by AFFF, and locations impacted by airborne PFAS emissions